Executive **Summary**

WATER ENVIRONMENT & REUSE FOUNDATION

Seeking credits on water quality benefits from stream restoration?

Stream Restoration BMP Database: Version 1.0 Summary Report (U5R14)

The Central Issue

As communities increasingly seek credits for restoration projects to help reach permit requirements, they need a framework for consistently evaluating the water quality benefits of various stream restoration practices.

Context and Background

The International Stormwater Best Management Practice (BMP) Database (www.bmpdatabase.org) is a long-term project that has grown and evolved over the past 20 years to help document the performance of urban stormwater BMPs. The database has recently expanded to include performance modules for agricultural practices and for stream restoration practices. With this expansion, the BMP Database has become an integrated repository of available data on the efficacy of BMPs from a variety of sectors for reducing pollutant loading and improving water quality (Figure 1).

This research expanded the BMP Database with a project information storage tool for stream restoration crediting programs. In this report, the researchers provide guidance on project characteristics that should be reported with stream restoration projects. They also conducted an extensive literature review and collaborated with several WE&RF subscribers to develop the Stream Restoration BMP Database (SRDB).

Findings and Conclusions

The BMP Database was expanded to include a database module for stream restoration practices. The new SRDB is a tool to help support stream restoration water quality crediting programs and performance evaluations. It can support stream restoration practice selection and design efforts, as well as stream restoration performance evaluations. The tool is a resource to support credit quantification with reasonable, geographically appropriate input values for crediting equations.

The studies available indicate that stream restoration can provide water quality improvement, but significantly more data are needed to assess which practices are most effective and under which conditions. Water quality data are highly variable between the studies and from year-to-year or season-to-season within the same study. This variability presents a challenge when attempting to detect a statistically significant change in concentrations and loads for an individual study or a group of studies of the same practice.

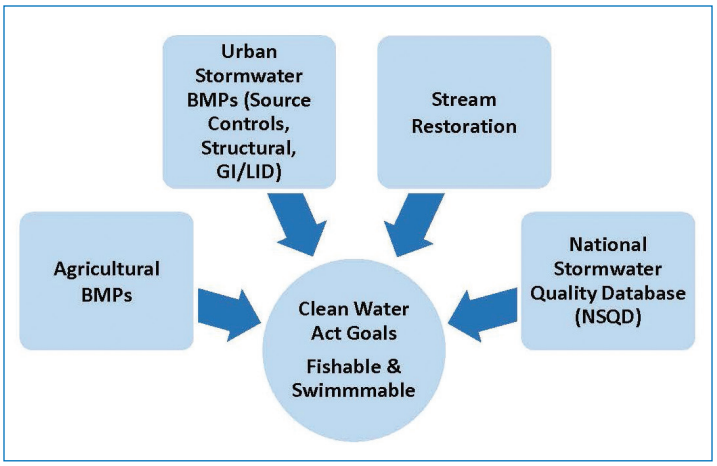

Figure 1. BMP Database Modules.

Practices with the most well-developed data sets included bed and bank stabilization, riparian buffers, in-stream enhancement, and floodplain reconnection. To date, water quality parameters with the most monitoring data available are sediment and nutrients. While the database can accept summary statistics, the underlying datasets are ultimately more useful for conducting independent analyses of stream restoration practices.

Management and Policy Implications

The study provides an overview of several general categories of stream restoration practices, introduces the SRDB structure and reporting parameters, provides guidance on performance evaluation approaches for stream restoration studies, provides summaries of stream restoration performance studies based on the first release of the SRDB, and identifies further research needs. It will be helpful to users as they explore a way to obtain credits on water quality benefits from stream restoration efforts (e.g., as pollutant load reduction).

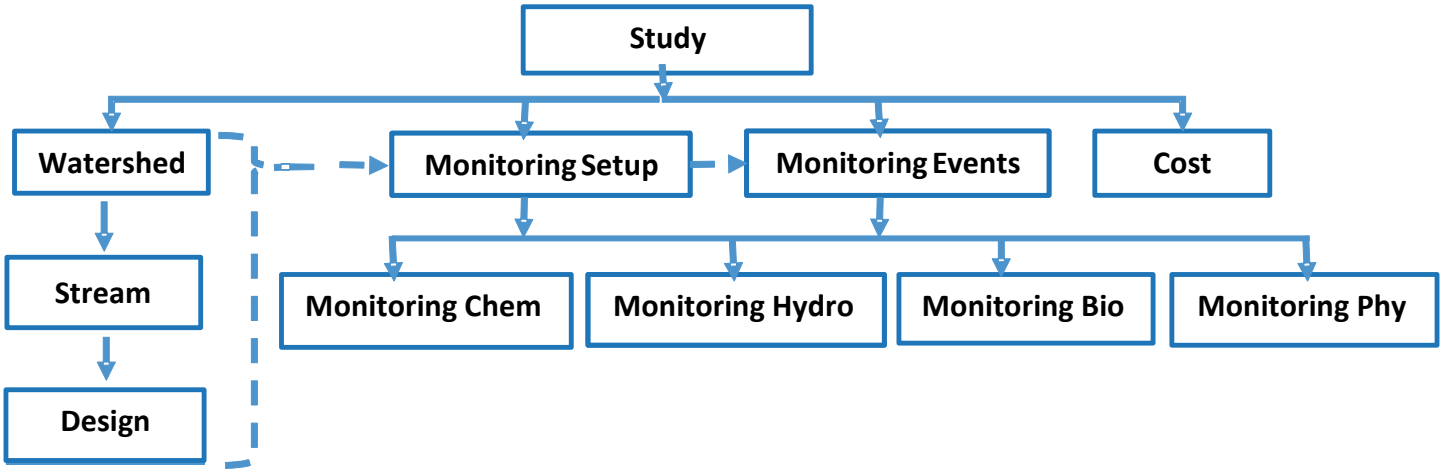

Figure 2. The Stream Restoration BMP Database follows a relational database model that organizes data into 11 tables of information.

Related WE&RF Research

Project Title	Research Focus
Stream Restoration as a BMP: Crediting Guidance (WERF1T13)	As a parallel effort, WERF1T13 provides a general technical framework for quantifying the water quality benefits of a specific suite of stream restoration practices.
International Stormwater Best Management Practices (BMP) Database (03SW1COT)	The International Stormwater Best Management Practices (BMP) database is an important tool that allows for continued improvement in design and implementation of BMPs. It provides a mechanism for scientifically based collection and management of data needed to evaluate the effectiveness of stormwater runoff BMPs.
International Stormwater Best Management Practices (BMP) Database: BMP Performance Analysis Compendium (03SW1COe1)	Includes technical papers on BMP performance for nutrients, solids, metals, fecal indicator bacteria, and runoff volume.
Performance and Whole Life Costs of Best Management Practices and Sustainable Urban Drainage Systems (01CTS21Ta)	Documents the performance and whole life costs of Best Management Practices (BMPs) and Sustainable Urban Drainage Systems (SUDS).

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